

Results

Present your results in table form in the space below.

Molar Heat of Combustion Data								
Alcohol	Test	Mass (g)	Start Temp	End Temp	ΔT	Calorimeter	Mass of Water	Calorimeter Constant
Ethanol $\text{C}_2\text{H}_5\text{OH}$ $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	1	50	23	60	37	30.1	302.4	1.2
	2	50	28	68	40	30.1	302.4	6.1
	Average	50	25.5	64	38.5	-	-	3.3
methanol CH_3OH $\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{O}-\text{H} \\ \\ \text{H} \end{array}$	1	50	26	61	35	220.8	211.6	4.2
	2	50	32	67	35	262.5	211.1	2.4
	Average	50	-	-	35	-	-	3.3
propan-2-ol $\text{C}_3\text{H}_7\text{OH}$ $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	1	50	25	60	35	255.7	254.8	0.9
	2	50	28	63	35	254.2	253.8	1
	Average	50	-	-	35	-	-	0.95

Conclusion

To conclude, though the experiment undertaken, it was possible to determine the molar heat of combustion of ethanol, methanol and propan-2-ol, however with, however, a large inaccuracy and unreliability.

Results

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	Initial Temp (°C)	Final Temp (°C)	Heat Capacity (J/°C)	Δ Temperature (°C)
First trial Ethanol	283.50g	271.20g	100	25-45°C
Second trial Ethanol	258.50g	257.20g	50	20-45°C
First trial Methanol	237.5	256.7	100	25-35°C
Second trial Methanol	157.5	157.4	100	25-40°C
First trial 2-propanol	256.00g	255.55g	100	25-40
Second trial 2-propanol	287.9	287.2	100	27-33°C
Third trial 2-propanol	273.3	273.1	100	25-34°C

Conclusion

Methanol has the least heat capacity.
 Ethanol has a higher heat capacity than
 Methanol. However 2-propanol has the highest heat capacity.

Results

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Molar Heat of Combustion of Ethanol, Methanol and Propan-2-ol									
Measurement	Ethanol			Propan-2-ol			Methanol		
Initial Temperature of Water (°C)	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3
	20	22	10.5	25	27	27	25	25	27
Final Temperature of Water (°C)	45	42	30	40	33	52	40	35	55
Initial Mass of Spirit Burner (g)	283.50	208.40	282.20	256.90	287.9	280.4	152.00	252.5	260.4
Final Mass of Spirit Burner (g)	282.20	207.80	281.30	255.55	287.2	278.9	251.40	256.7	259.4
Mass of Water (g)	100	100	100	100	100	100	100	100	100
Temperature Change (K)	25	20	9.5	15	6	25	15	10	28

Conclusion

The molar heat of combustion of ethanol, propan-2-ol and methanol were determined and compared successfully by conducting the experiment and obtaining averages.

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	Starting Temp (°C)	Ending Temp (°C)	Change Temp (K)	Ethylene used (g)
tempt 1	19	74	55	1.4
tempt 2	19	54	35	1.3

$$q = m C \Delta T$$

$$= 50 \text{ g} \times 4.18 \text{ J/g}^\circ\text{K} \times 55 \text{ K}$$

$$= 11.50 \text{ kJ}$$

$$n(\text{C}_2\text{H}_5\text{OH}) = \frac{1.4 \text{ g}}{46.068 \text{ g/mol}}$$

$$= 0.03 \text{ mol}$$

$$\Delta H = \frac{q}{n}$$

$$= \frac{11.50 \text{ kJ}}{0.03 \text{ mol}}$$

$$= 383.3 \text{ kJ/mol}$$

$$= 3.83 \times 10^2 \text{ kJ/mol}$$

$$q = m C \Delta T$$

$$= 50 \text{ g} \times 4.18 \text{ J/g}^\circ\text{K} \times 35 \text{ K}$$

$$= 7.31 \text{ kJ}$$

$$n(\text{C}_2\text{H}_5\text{OH}) = \frac{1.3 \text{ g}}{46.068 \text{ g/mol}}$$

$$= 0.03 \text{ mol}$$

$$\Delta H = \frac{q}{n}$$

$$= \frac{7.31}{0.03}$$

$$= 259 \text{ kJ/mol}$$

28	282.4
71	282.1

Ethanol
50g water
Starting: 19°C
Ending: 74°C
Ethylene 288.7g
287.3g

50g water
starting: 19°C
Ending: 54°C
Ethylene: 287.4g
286.1g

Methanol
50g water
Starting: 28°C
Ending: 29°C
Meth. m. s: 260.7

Methanol $\rho = 259.8$
2nd water 30°C
Methanol 259.8
52°C 288.6
22°C 1.2

Propan-2-ol 24g
24°C 294.6
35°C 293.7

Conclusion

	Temp (°C)			(g) Mass of Hydrocarbon			Mass of water (g)	$\Delta H (\text{kJ/mol})$
	Starting	Ending	Change	Starting	Ending	Change		
1	19	74	55	288.7	287.3	1.4	50	3.83
2	19	54	35	287.4	286.1	1.3	50	259
3	30	52	22	259.8	258.6	1.2	50	12.4
4	26	71	45	282.4	282.1	0.3	50	
5	24	35	11	294.6	293.7	0.9	50	